Planetary Video

Planetary videos are cool because they show actual objects in motion – vs just looking at still pictures. However, the amount of work required to produce them is generally not appreciated by the people that watch them.

This document illustrates the steps required to produce a very short 14 frame video of Jupiter and 3 of its moons. All in all, it probably took me about 5 hours to do all this - including figuring it out and documenting it. It would probably take me about 1-2 hours if I had to do it over again now that I know how.

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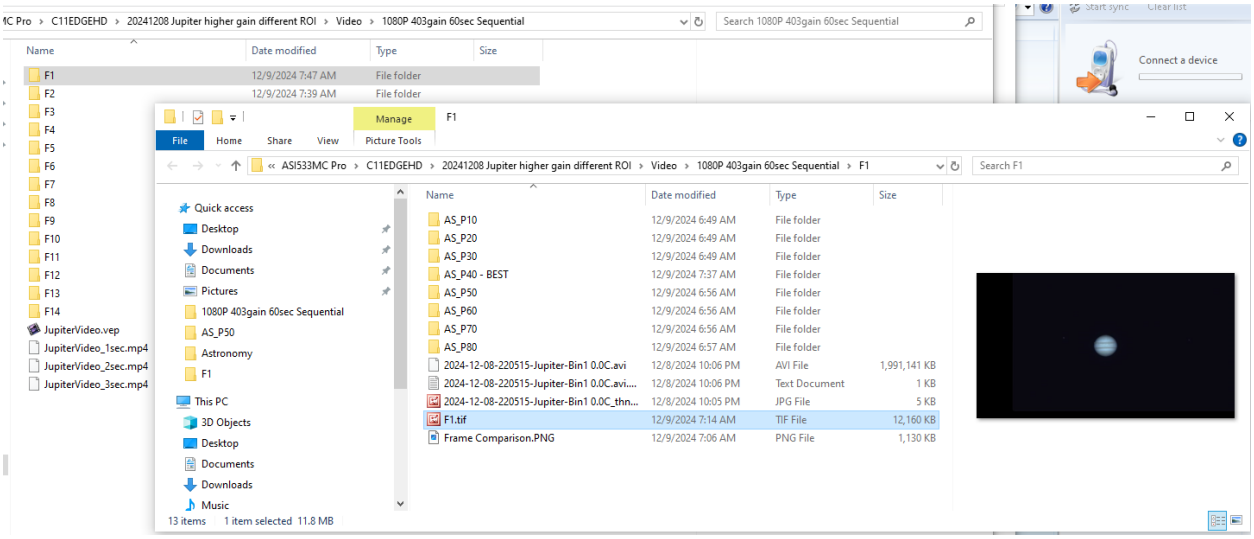
Using Video & AutoStakkert! (Planets)

Step 1 – Record 14x 60 second sequential videos

Go outside and record 14 short videos, one after the other of Jupiter. This is done in the normal manner and just takes time to get everything setup and focused. This took roughly 2 hours outside with my telescope.

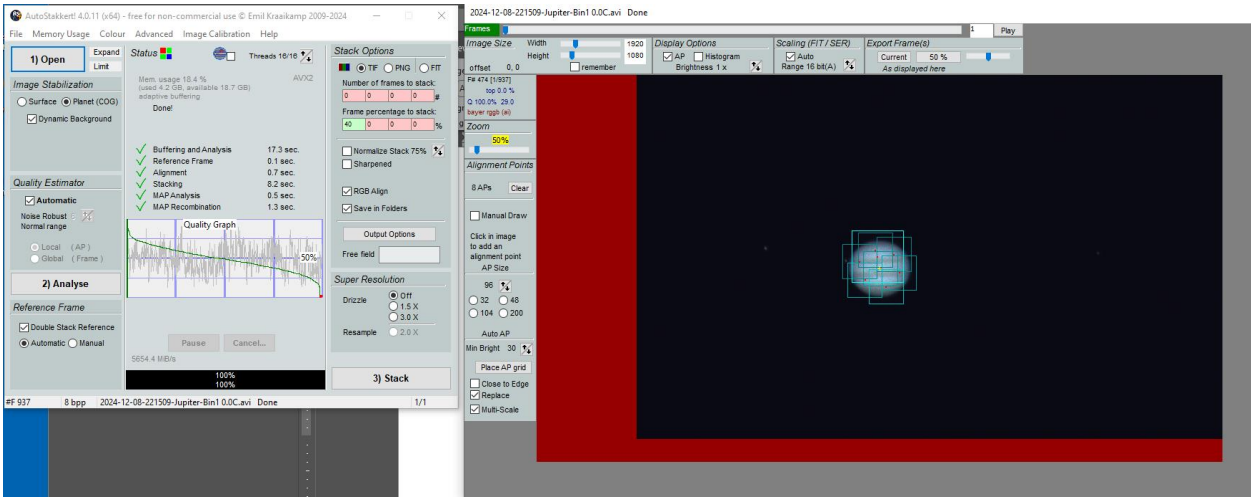
Step 2 – Transfer and Organize the Collected Videos on your Computer

You need to separate each of the videos into its own folder so the stacking software doesn't overwrite all the images.



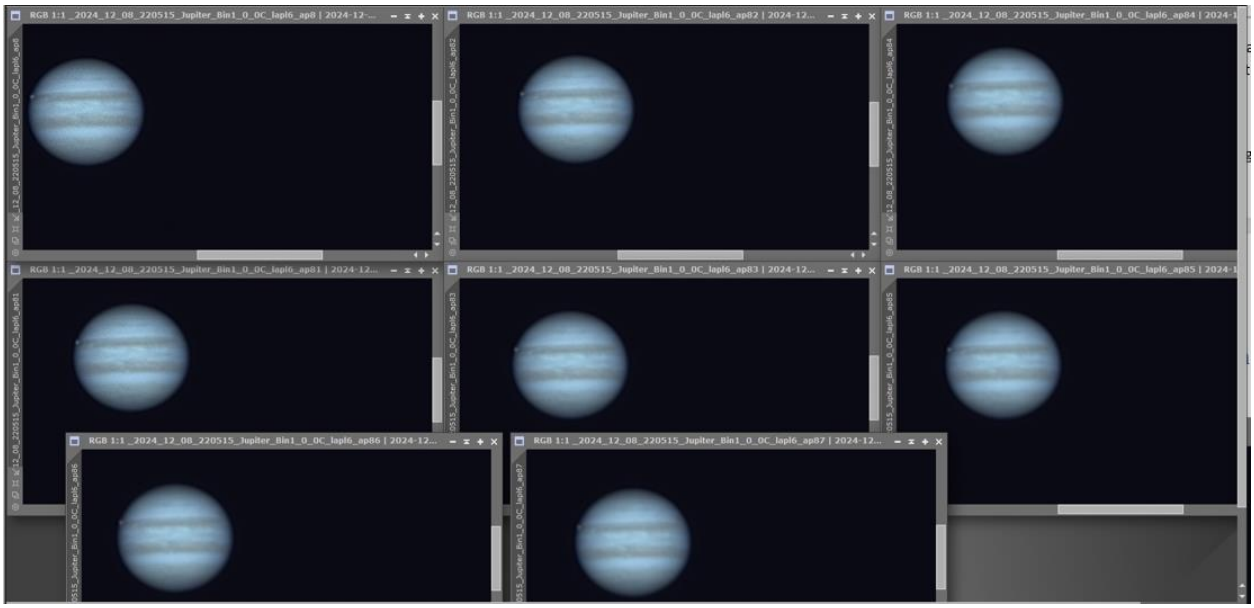
Note how multiple folders are used in the first frame. This is so that you can experiment with the frame percentages to figure out the best quality of the stacked image. Once you figure this out on the first frame, you can use the same setting on all subsequent frames.

Step 3 – Process each Video Through AutoStakkert! Lucky Stacking Software



This will generate a ‘tif’ file for each frame from the ‘avi’ video file. You have to experiment with the settings to determine how to get the best quality image.

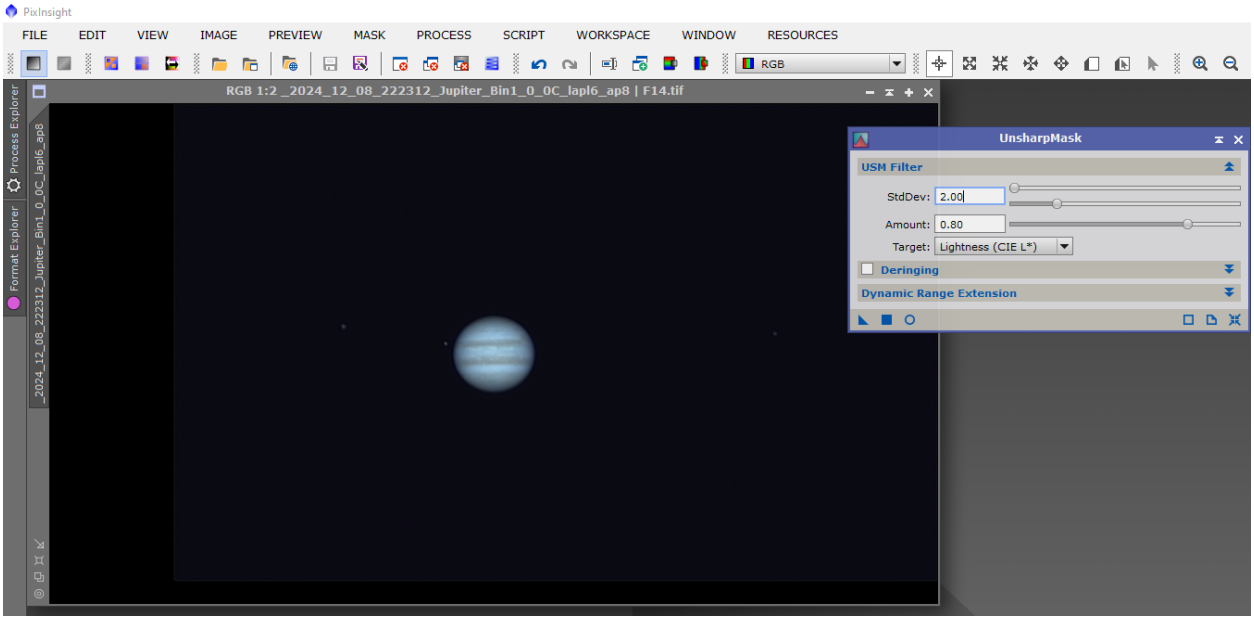
Below you can see how the 8 different stacking percentages affected the stacked image. By subjective examination I determined that the 4th image (40% of frames stacked) was the best looking.



Once I figured this out, I just used 40% of frames for all the subsequent images as well.

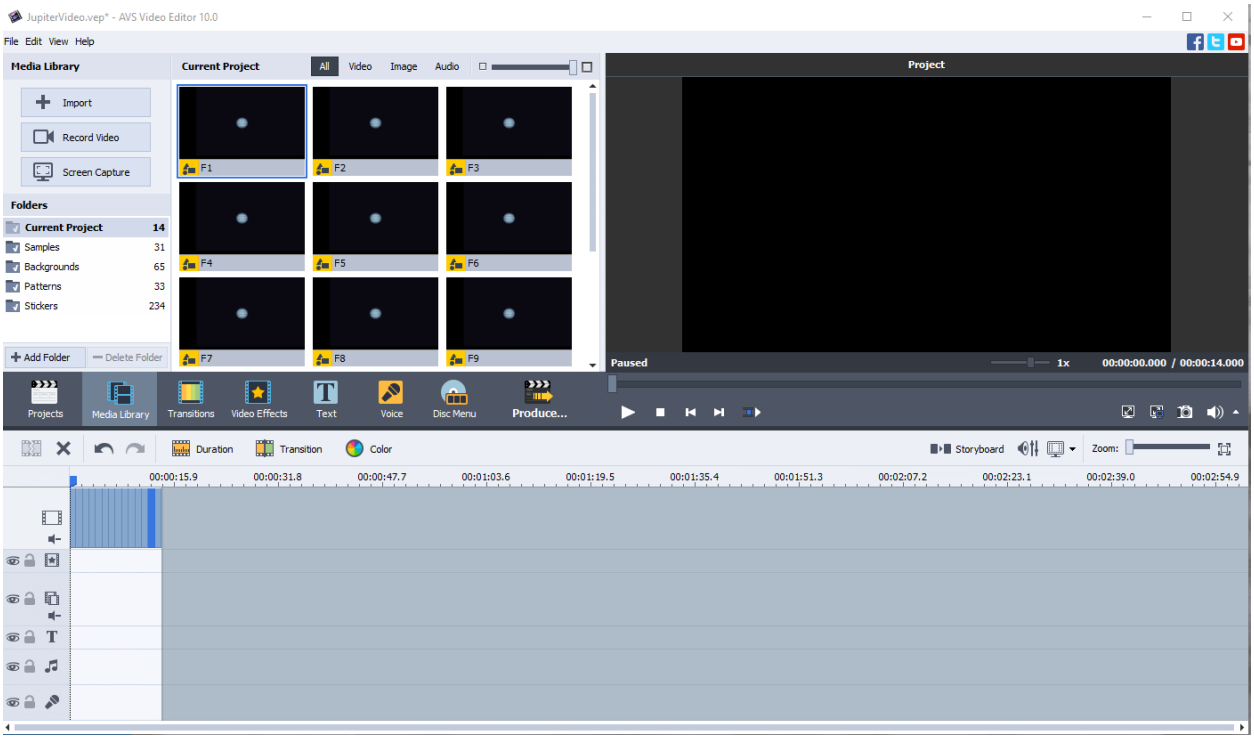
Step 4 – Process each Stacked Image Through PixInsight to Clean it Up

You can do a little, or a lot, depending on how much you want to clean the image up. In this instance I only used the UnsharpMask feature on each frame.



Step 5 – Build a Video using the Cleaned-Up Images

Then you need to put all the frames together into a video using something like AVS Video Editor. You can adjust the frame duration so the video is not too slow (and boring) and not too fast so you can't really see anything. You can save it in various formats – I used mp4 to preserve the quality, but you could use gif to make is smaller but not as good.



Step 6 – Share the Video with Others

You can see this short video on my website here:

MP4 Video Link of Jupiter

Note that this video shows the motion MUCH faster than real life – the real motion is about 100 times slower. What you see on the video in a few seconds actually took about 30 minutes in real life.

Using Simple Images (Moon)

For objects (such as the moon) which do not rotate you can save some effort and take simple images. This is also a benefit when the event you are trying to capture is occurring quickly and you don't have much time, or you want to use that time to try different exposure settings.

This might be the case during a lunar eclipse where your lighting conditions are changing dramatically during the event.

Step 1 – Take as many simple Preview images as you need of the event.

Don't worry about whether there are crappy ones in there as they will be sorted out later.

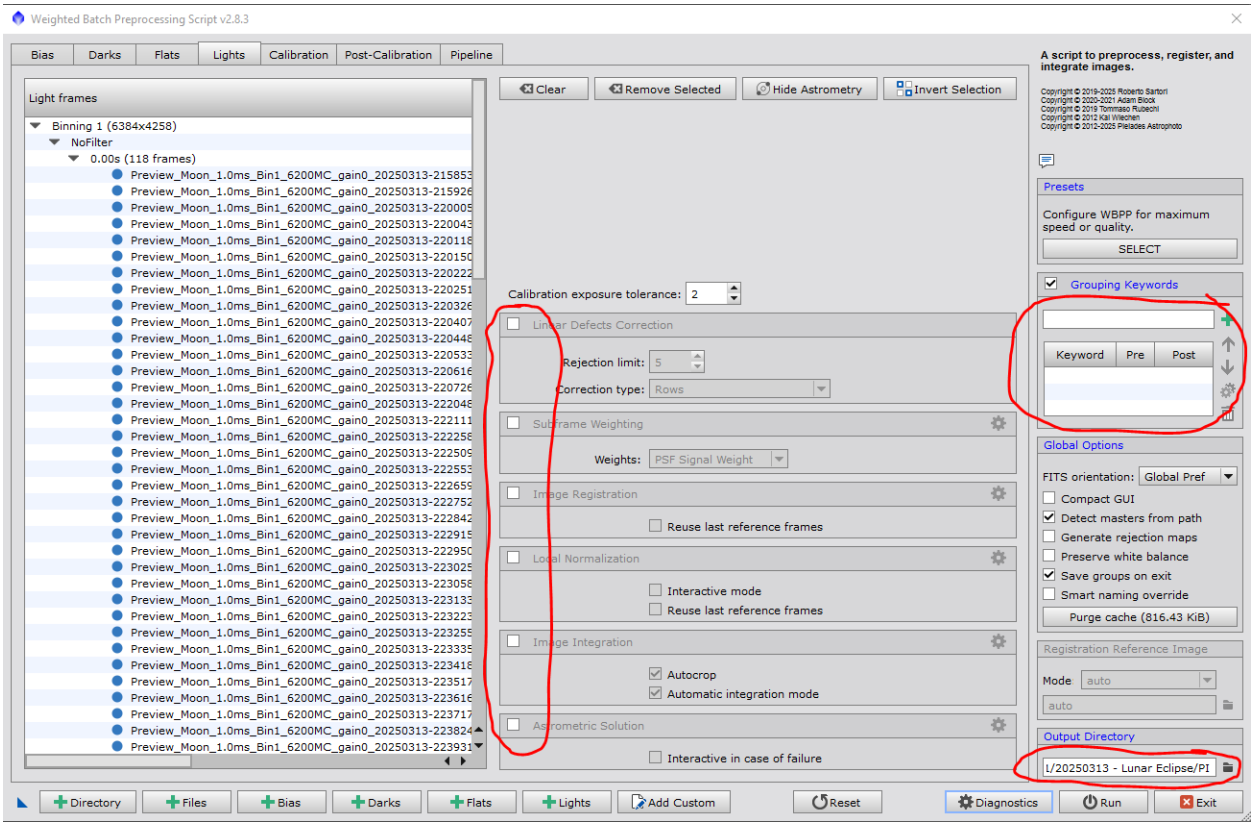
Step 2 – Transfer all your images to a single folder

Don't split anything up yet.

Step 3 – Calibrate and Debayer the images with WBPP

Load your Bias, Dark, and any Flats into WBPP.

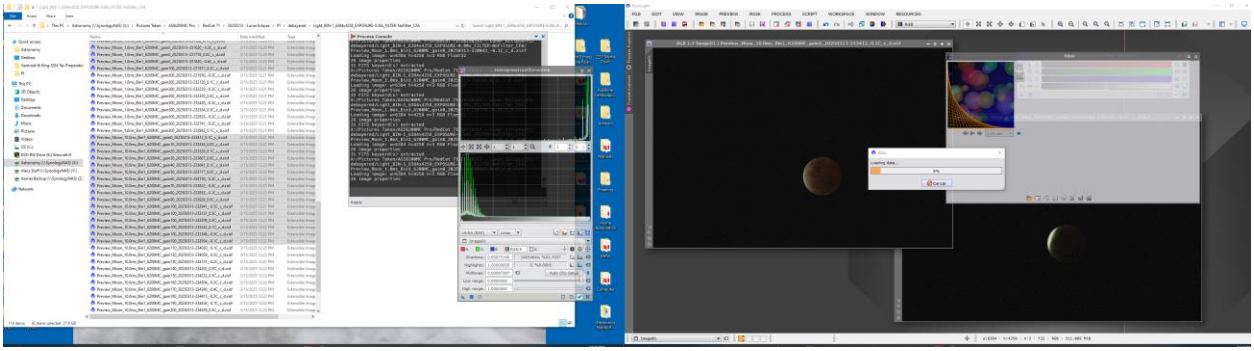
Load ALL of your Light images into WBPP, and un-check all of the processing steps (see below) so that only calibration and debayer will be performed. Make sure there are no grouping keywords so that everything is processed into a single folder and setup the output folder. Hit Run.



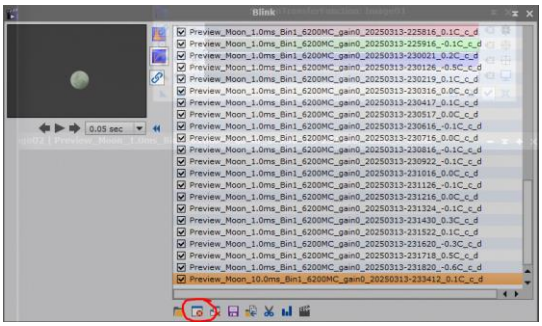
Once complete all your files will be in the output folder 'debayered' folder.

Step 4 – Use Blink to pick out the files to use

Load all of the debayered files into Blink.



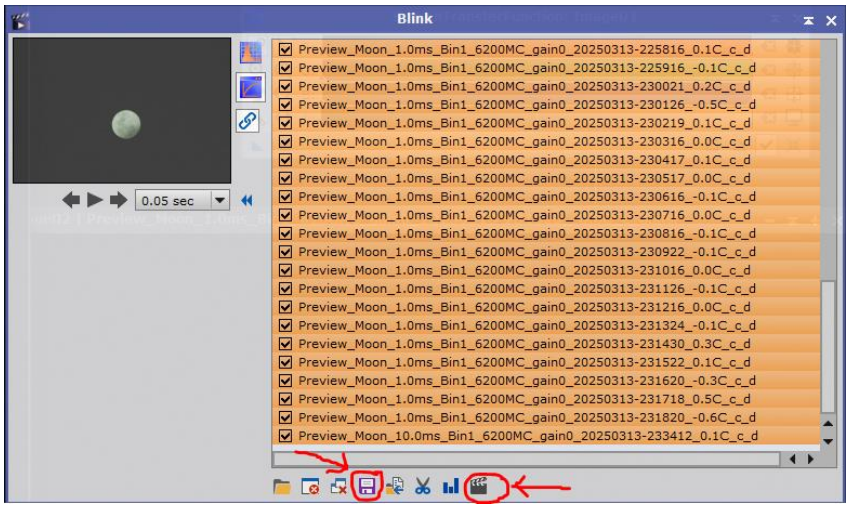
Then play the video, or step through them one at a time. As you find a file that doesn't look good, or doesn't seem to fit, remove it (using the tool icon shown below) from the file list in Blink (this won't delete it – just remove it from Blink.)



The nice thing about Blink is that it will apply standard Screen Transfer Functions (unique to Blink – not tied to the STF tools) so that you can easily see all the files.

When you have the video looking good, you have two choices:

1. Use the Crop and Create Video tool icon (Quick & Dirty)
    a. This is simpler and tells Blink to generate stretched (using default STF levels) png files for each of the images in your file list -> your specified output directory.
    b. Clear the Program and Arguments fields so that Blink doesn't actually run the ffmpeg.exe tool (which is incredibly complicated) and simply generates individual png files in your specified Output Directory.
        i. Defaults: ffmpeg.exe -y -r 25 -i Blink%05d.png Blink.avi
    c. Please note that this can take quite a long time, especially if you have very large files (APSC or full frame) – typically about a minute or two for each file.
2. Use the Copy Selected Files tool icon (If you want to make it perfect)
    a. First select (not the checkbox) all; click on top file, scroll to bottom, shift-click bottom file
    b. Then click on the Copy Selected Files tool icon and pick a folder
    c. This will copy all of the selected files to the new folder where you can then hand process them for better results. This is nice because you can operate on copies without altering the originals and you know that you have the set of files that actually look good.



Step 5 – Generate Video using your preferred Video Editing Software

See the section above for more details.